ABSTRACT OF THE DISCLOSURE

A method for producing beta-carotene and carotene-related pigments in which a plurality of thermophilic microorganisms is collected and screened for the production of pigments. Those pigment-producing thermophilic microorganisms having yellow, red or orange coloration are identified and separated from the collection of thermophilic microorganisms. Thereafter, the selected pigment-producing thermophilic microorganisms are mutated by non-recombinant means to enhance pigment production, forming a mutant pigment-producing thermophilic microorganism. In accordance with one embodiment of this invention, a gene of interest suitable for producing a protein of interest is introduced into the mutant pigment-producing thermophilic microorganism, resulting in over-production of the carotene pigment and the protein of interest. Also disclosed are suitable plasmids and expression vectors suitable for use in the method of this invention.